

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DEC 15 2003

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet 1 of 5

Complete if Known

Application Number	10/656,342
Filing Date	4 September 2003
First Named Inventor	Lester F. Ludwig
Group Art Unit	UNKNOWN
Examiner Name	UNKNOWN
Attorney Docket Number	2738-13

U.S. PATENT DOCUMENTS

Examiner Initials *	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number - Kind Code ² (if known)			
<i>BB</i>	A1	US-3,519,331	07-07-1970	Cutrona et al.	
<i>BB</i>	A2	US-4,572,616	02-25-1986	Kowel et al.	
<i>BB</i>	A3	US-5,016,976	05-21-1991	Homer et al.	
<i>BB</i>	A4	US-5,081,046	10-29-1991	Lee et al.	
<i>BB</i>	A5	US-5,323,472	06-21-1994	Falk	
<i>BB</i>	A6	US-5,416,618	05-16-1995	Juday	
<i>BB</i>	A7	US-5,426,521	06-20-1995	Chen et al.	
<i>BB</i>	A8	US-5,432,336	07-11-1995	Carangelo et al.	
<i>BB</i>	A9	US-5,544,252	08-08-1996	Iwaki et al.	
<i>BB</i>	A10	US-5,706,139	01-06-1998	Kelly	
<i>BB</i>	A11	US-5,815,233	09-29-1998	Morokawa et al.	
<i>BB</i>	A12	US-5,859,728	01-12-1999	Colin et al.	
<i>BB</i>	A13	US-5,959,776	09-28-1999	Pasch	
<i>BB</i>	A14	US-6,021,005	02-01-2000	Cathey, Jr. et al.	
<i>BB</i>	A15	US-6,229,649 B1	05-08-2001	Woods et al.	
<i>BB</i>	A16	US-6,252,908 B1	06-26-2001	Tore	
<i>BB</i>	A17	US-6,404,553 B1	06-11-2002	Wootton et al.	
<i>BB</i>	A18	US-6,421,163 B1	07-16-2002	Culver et al.	
<i>BB</i>	A19	US-6,505,252 B1	01-07-2003	Nagasaka	

FOREIGN PATENT DOCUMENTS

Examiner Initials *	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ³
		Country Code ⁴ - Number ⁴ - Kind Code ⁵ (if known)				
<i>BB</i>	B1	JP A 05-066377	03-19-1993	Amako Atsushi et al.		

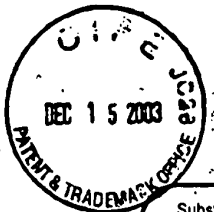
Examiner
Signature*John Ziffer*Date
Considered

30 APRIL 2004

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04.³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 18 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.



PTO/SB/08B(10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

Substitute for form 1449A/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Application Number	10/656,342
		Filing Date	4 September 2003
		First Named Inventor	Lester F. Ludwig
		Group Art Unit	Unknown
		Examiner Name	Unknown
		Attorney Docket Number	2738-13
Sheet	2	of	5

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
ff	C1	SUMIYOSHI ABE, et al., "An optical implementation for the estimation of the fractional-Fourier order", Optics Communications 137 (May 1, 1997), 214-218.	
ff	C2	N. I. ACHESER, Theory of Approximation, Dover, New York, 1992. pp. 1-23 & 78-81.	
ff	C3	JUN AMAKO, et al., "Kinoform using an electrically controlled birefringent liquid-crystal spatial light modulator", Applied Optics, vol. 30, No. 32, Nov. 10, 1991, pp. 4822-4828.	
ff	C4	V. BARGMANN, "On a Hilbert Space of Analytical Functions and an Associated Integral Transform," Comm. Pure Appl. Math, vol. 14, 1961, 187-214.	
ff	C5	L. M. BERNARDO, O. D. D. Soares, "Fractional Fourier Transforms and Imaging," Journal of Optical Society of America, vol. 11, No. 10, Oct. 1994, pp. 2622-2625.	
ff	C6	PHILIP M. BIRCH, et al., "Real-time optical aberration correction with a ferroelectric liquid-crystal spatial light modulator", Applied Optics, vol. 37, No. 11, Apr. 10, 1998, pp. 2164-2169.	
ff	C7	Y. BITRAN, H. M. OZAKTAS, D. MENDLOVIC, R.G. DORSCH, A. W. LOHMANN, "Fractional Fourier Transform: Simulations and Experimental Results," Applied Optics vol. 34 No. 8, Mar. 1995. pp. 1329-1332.	
ff	C8	E.U. CONDON, "Immersion of the Fourier Transform in a Continuous Group of Functional Transforms," in Proceedings of the National Academy of Science, vol. 23, pp. 158-161, 1937.	
ff	C9	P. J. DAVIS, Interpolation and Approximation, Dover, New York, 1975. pp. 24-55, 108-185, 328-340.	
ff	C10	B. W. DICKINSON AND D. STEIGLITZ, "Eigenvectors and Functions of the Discrete Fourier Transform," in IEEE Transactions on Acoustics, Speech, and Signal Processing, vol. ASSP-30, No. 1, Feb. 1982.	
ff	C11	R. DORSCH, "Fractional Fourier Transformer of Variable Order Based on a Modular Lens System," in Applied Optics, vol. 34, No. 28, pp. 6016-6020, Sep. 1995.	

Examiner Signature		Date Considered	30 APRIL 2004
--------------------	--	-----------------	---------------

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.



PTO/SB/08B(10-01)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

Substitute for form 1449A/PTO		Complete if Known			
		Application Number	10/656,342		
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Filing Date	4 September 2003		
		First Named Inventor	Lester F. Ludwig		
		Group Art Unit	Unknown		
		Examiner Name	Unknown		
Sheet	3	of	5	Attorney Docket Number	2738-13

OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
JB	C12	M. FATIH ERDEN, et al., "Design of dynamically adjustable anamorphic fractional Fourier transformer", Optics Communications 135 (Mar. 1, 1996), pp. 52-60.	
JB	C13	M. F. ERDEN, "Repeated Filtering in Consecutive Fractional Fourier Domains," doctoral dissertation at Bilkent Univ., Aug. 18, 1997.	
JB	C14	G. B. FOLLAND, Harmonic Analysis in Phase Space, Princeton University Press, Princeton, NJ, 1989. pp. 51-55, 223-224, 236-239, 193.	
JB	C15	J. W. GOODMAN, Introduction to Fourier Optics, McGraw-Hill, New York, 1968. pp. 77-197.	
JB	C16	E. HECHT, "Gin Systems", Optics. Third Edition, Ch. 6, section 6.4, pp. 277-280, Addison-Wesley publishing. (c) 1998.	
JB	C17	K. IIZUKA, Engineering Optics, Second Edition, Springer-Verlag, 1987. pp. 238-311.	
JB	C18	SANG-II JIN, et al., "Generalized Vander Lugt Correlator with fractional Fourier transforms for optical pattern recognition systems", Lasers and Electro-Optics, 1997, CLEO/Pacific Rim, Pacific Rim Conf. on. p. 311.	
JB	C19	F. H. KERR, "A Distributional Approach to Namias' Fractional Fourier Transforms," in Proceedings of the Royal Society of Edinburgh, vol. 108A, pp. 133-143, 1983.	
JB	C20	F. H. KERR, "On Namias' Fractional Fourier Transforms," in IMA J. of Applied Mathematics vol. 39, No. 2, pp. 159-175, 1987. -efficient	
JB	C21	M. A. KUTAY, M. F. ERDEN, H.M. OZATKAS, O. ARIKAN, C. CANDAN, O. GULERYUZ, "Cost-effective Approx. of Linear Systems with Repeated and Multi-channel Filtering Configurations," IEEE pp 3433-3436 May 12, 1998.	

Examiner Signature	<i>Lester F. Ludwig</i>	Date Considered	30 APRIL 2004
--------------------	-------------------------	-----------------	---------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.



PTO/SB/08B(10-01)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

Substitute for form 1449A/PTO		Complete if Known			
		Application Number	10/656,342		
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Filing Date	4 September 2003		
		First Named Inventor	Lester F. Ludwig		
		Group Art Unit	Unknown		
		Examiner Name	Unknown		
Sheet	4	of	5	Attorney Docket Number	2738-13

OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
✓ <i>LL</i>	C22	M. A. KUTAY, "Generalized Filtering Configurations with Applications in Digital and Optical Signal and Image Processing," doctoral dissertation at Bilkent Univ. Feb. 24, 1999.	
✓ <i>LL</i>	C23	M. A. KUTAY, M. F. ERDEN, H. M. OZATKAS, O. ARIKAN, C. CANDAN, O. GULERYUZ, "Space-bandwidth-efficient Realizations of Linear Systems," Optics Letters, vol. 23 No. 14, Jul. 15, 1998. pp. 1069-1071.	
✓ <i>LL</i>	C24	N. N. LEBEDEV, Special Functions and their Applications, Dover, New York, 1965. pp. 60-77.	
✓ <i>LL</i>	C25	L. LEVI, Applied Optics, vol. 2 (Sec. 19.2), Wiley, New York, 1980.	
✓ <i>LL</i>	C26	ADOLF W. LOHMANN, "A fake zoom lens for fractional Fourier experiments", Optics Communications 115 (Apr. 1, 1995) 437-443.	
✓ <i>LL</i>	C27	L. F. LUDWIG, "General Thin-Lens Action on Spatial Intensity (Amplitude) Distribution Behaves as Non-Integer Powers of Fourier Transform," Spatial Light Modulators and Applications Conference, South Lake Tahoe, 1988.	
✓ <i>LL</i>	C28	M. E. MARHIC, "Roots of the Identity Operator and Optics," Journal of Optical Society of America, vol. 12, No. 7, Jul. 1995. pp. 1448-1459.	
✓ <i>LL</i>	C29	V. NAMIAS, "The Fractional Order Fourier Transform and its Application to Quantum Mechanics," in J. of Institute of Mathematics and Applications, vol. 25, pp. 241-265, 1980.	
✓ <i>LL</i>	C30	H. M. OZAKAS, "Digital Computation of the Fractional Fourier Transform," IEEE Transactions on Signal Processing, Vol. 44, No. 9, pp. 2141-2150, September 1996.	
✓ <i>LL</i>	C31	H. M. OZAKTAS, D. MENDLOVIC, "Every Fourier Optical System Is Equivalent to Consecutive Fractional-Fourier-domain Filtering," Applied Optics, vol. 35, No. 17, Jun. 1996. pp. 3167-3170.	
✓ <i>LL</i>	C32	H. M. OZAKTAS, D. MENDLOVIC, "Fourier Transforms of Fractional Order and their Optical Interpretation," Optics Communications, vol. 101, No. 3, 4 pp. 163-169.	

Examiner Signature	<i>Lester F. Ludwig</i>	Date Considered	30 APRIL 2004
-----------------------	-------------------------	--------------------	---------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Complete if Known			
		Application Number	10/656,342,		
		Filing Date	4 September 2003		
		First Named Inventor	Lester F. Ludwig		
		Group Art Unit	Unknown		
		Examiner Name	Unknown		
Sheet	5	of	5	Attorney Docket Number	2738-13

OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
✓ <i>HL</i>	C33	H. M. OZAKTAS, D. MENDLOVIC, "Fractional Fourier Transforms and their Optical Implementation I," Journal of the Optical Society of America, A vol. 10, No. 9, pp. 1875-1881, Sep. 1993.	}
✓ <i>HL</i>	C34	H. M. OZAKTAS, D. MENDLOVIC, "Fractional Fourier Transforms and their Optical Implementation II," Journal of the Optical Society of America, A vol. 10, No. 12, pp. 2522-2531, Dec. 1993.	
✓ <i>HL</i>	C35	H. M. OZAKTAS, M. A. KUTAY, O. ARIKAN, L. ONURAL, "Optimal filtering in Fractional Fourier Domains," IEEE Transactions on Signal Processing, vol. 45, No. 5, pp. 1129-1143, May 1997.	
✓ <i>HL</i>	C36	H. M. OZAKTAS, H. OZAKTAS, M. A. KUTAY, O. ARIKAN, M. F. ERDEN, "Solution and Cost Analysis of General Multi-channel and Multi-stage Filtering Circuits," IEEE, Piscataway, N. J., pp 481-484, Oct. 1998.	
✓ <i>HL</i>	C37	H. M. OZAKTAS, H. OZAKTAS, M. A. KUTAY, O. ARIKAN, "The Fractional Fourier Domain Decomposition (FFDD)," Signal Processing, 1999. 4 pgs.	
✓ <i>HL</i>	C38	A. PAPOULIS, "Systems and Transforms with Applications in Optics," Krieger, Malabar, Florida, 1986. pp. 1, 344-355, 410-421, 430-435.	
✓ <i>HL</i>	C39	S. THANGAVELU, "Lectures on Hermite and Laguerre Expansions," Princeton University Press, Princeton, New Jersey, 1993. pp. 1-23, 84-91, 110-118.	
✓ <i>HL</i>	C40	N. WIENER, "The Fourier Integral and Certain of Its Applications," (Dover Publications, Inc., New York, 1958) originally Cambridge University Press, Cambridge, England, 1933. pp. 46-71.	
✓ <i>HL</i>	C41	"Taking the Fuzz out of Photos," Newsweek, vol. CXV, No. 2, Jan. 8, 1990.	

Examiner Signature	<i>Gabin Gulya</i>	Date Considered	30 APRIL 2004
-----------------------	--------------------	--------------------	---------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.